

REMARKS

By this amendment, claims 1-5 have been cancelled, and claims 6-12 have been added. Thus, claims 6-12 are now active in the application. Reexamination and reconsideration of the application is respectfully requested.

The specification and abstract have been carefully reviewed and revised to correct grammatical and idiomatic errors in order to aid the Examiner in further consideration of the application. The amendments to the specification and abstract are incorporated in the attached substitute specification and abstract. No new matter has been added.

Attached hereto is a marked-up version of the changes made to the specification and abstract by the current amendment. The attachment is captioned "**Version with markings to show changes made.**"

Initially, the Examiner's attention is directed to the Information Disclosure Statement filed on January 13, 2004, subsequent to issuance of the December 4, 2003 Office Action. Consideration of the references cited in the Information Disclosure Statement is respectfully requested.

In item 3 on page 2 of the Office Action, the Examiner required that Fig. 3 be designated by a legend such as "Prior Art". Accordingly, a replacement formal drawing for Fig. 3 is submitted herewith under separate cover letter in order to label Fig. 3 as "Prior Art." In fact, replacement formal drawings for all of the drawings are submitted herewith. In particular, the original four (4) sheets of drawings containing Figs. 1-3, as well as a listing of the reference numerals in the drawings, are replaced with three (3) sheets of drawings containing Figs. 1-3, with sheet 4/4 (which contained the listing of the reference numerals in the drawings) being canceled. The replacement formal drawings are also effective to remove the drawing sheet labels 1/4, 2/4, 3/4. Approval of the replacement formal drawings is respectfully requested.

In item 4 on page 2 of the Office Action, the Examiner required a new title of the invention more clearly descriptive of the claimed invention. Accordingly, the title has been changed to --Portable Computer Device with Detachable Loudspeaker Unit--.

In items 5 and 6 on pages 2-4 of the Office Action, claims 1-5 were rejected under 35 U.S.C. 103(a) as being unpatentable over Lee et al. (U.S. 6,191,942) in view of Pan-Ratzlaff

(U.S. 5,852,545). This rejection is respectfully traversed in part and, in any event, is believed moot in view of the cancellation of claims 1-5. Furthermore, it is respectfully submitted that the rejection is clearly inapplicable to the new claims 6-11, for the following reasons.

With exemplary reference to the drawing figures, claim 6 sets forth a portable computer device comprising: a computer main unit 1a, 1b having a mounting section 3b, 3c therein including a space, the mounting section 3b, 3c being provided with a first terminal section 3d2, 3d and a locking mechanism; and a loudspeaker unit 4 detachably lockable in the mounting section 3b, 3c of the computer main unit 1a, 1b by the locking mechanism; wherein the loudspeaker unit 4 includes a second terminal section 4b for connecting with the first terminal section 3d2, 3d and exchanging power and sound information signals with the computer main unit 1a, 1b; and wherein the loudspeaker unit 4 further includes an acoustic space and a port 4a for reproducing low-audio frequencies.

Thus, as now recited in claim 6, the portable computer device includes a detachable loudspeaker unit 4 having an acoustic space and a port 4a for reproducing low-audio frequencies. This loudspeaker unit will operate in conjunction with the speakers originally provided in the portable computer device that mainly produce sounds in the mid-audio frequency range, to thereby allow the portable computer device to reproduce audio over a considerably broader range of frequencies and produce richer sound quality.

In contrast to the present invention as defined in claim 6, the Lee et al. patent discloses a portable computer device including a computer main unit and detachable loudspeaker modules 20 received in receiving cavities 100 of the computer main unit, but the loudspeaker modules 20 of Lee et al. do not include an acoustic space and a port for reproducing low-audio frequencies, as required by claim 6.

The Examiner also cited the Pan-Ratzlaff patent for disclosing "the detachable speakers for the laptop computer that comprises the mounting section and the locking recesses" and also for disclosing "the audio speakers with a built-in amplifier." However, it is submitted that the Pan-Ratzlaff patent clearly fails to obviate the above-discussed shortcoming of the Lee et al. patent.

Therefore, because of the above-discussed distinctions between the present invention of claim 6 and the Lee et al. and Pan-Ratzlaff references, it is believed clear that the references do not disclose or suggest the features of claim 6 and therefore, that a person having ordinary skill in the art would not have been motivated to modify the Lee et al. patent or to make any combination of the references of record in such a manner as to result in or otherwise render obvious the present invention as recited in claim 6. Therefore, it is respectfully submitted that claim 6, as well as claims 7-11 which depend therefrom, are clearly allowable over the prior art of record.

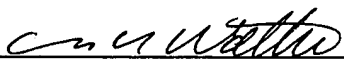
The Examiner's attention is also directed to the dependent claims 7-12 which set forth additional features of the invention in order to further define the invention over the prior art. For example, new claims 11 and 12 require the port 4a to be formed in the loudspeaker unit 4 such that, when the loudspeaker unit 4 is received in the mounting section 3b, 3c of the computer main unit 1a, 1b with the first terminal section 3d2, 3d connected with the second terminal section 4b, the port 4a opens to an exterior of the computer main unit 1a, 1b. Claim 11 further requires that the port 4a comprises an elongated chamber as illustrated in Figs. 1 and 2.

In view of the foregoing amendments and remarks, it is respectfully submitted that the present application is clearly in condition for allowance. An early notice thereof is earnestly solicited.

If, after reviewing this Amendment, the Examiner feels there are any issues remaining which must be resolved before the application can be passed to issue, it is respectfully requested that the Examiner contact the undersigned by telephone in order to resolve such issues.

Respectfully submitted,

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DESCRIPTION

Portable Computer Device With Detachable Loudspeaker Unit

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TECHNICAL FIELD

The present invention relates to a portable computer device including a notebook-sized personal computer.

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BACKGROUND ART

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10 A conventional portable computer device will be explained with reference to the perspective view shown in Fig. 3.

In Fig. 3, the portable computer device includes keyboard-equipped computer main unit 1, foldable display 2 made of a liquid crystal display (LCD), and loudspeaker units 5 disposed in space 6 in main unit 1.

15 Recently, ~~a portable computer device has~~ devices have been getting smaller, lighter, and more powerful. ~~It~~ The portable computer is not only used as a portable device, but is also convenient for indoor use, due to its small footprint, instead of a desktop computer. The fact has driven up the demand for the portable computer ~~device~~ devices.

20 However, such a portable computer, for example, completely relies on small loudspeaker units 5 for its sound response, so that reproduction of low-audio frequencies is not ~~in~~ at a satisfactory level. Therefore, in order to improve sound-response characteristics to a sufficient degree, a loudspeaker device with a built-in amplifier, which is similar to one employed for a desktop
25 computer, is required to connect with the portable computer device.

As described in the example above, the portable computer device needs to ~~connect~~ have another device connected therewith, such as peripheral devices

employed for desktops, for its versatility. The fact inconveniently tends to impair the merit of the portable computer, that is, being compact.

DISCLOSURE OF THE INVENTION

5 The object of the present invention is to provide a portable computer device, making the most of its advantages, i.e., compact size and high performance.

The portable computer device of the present invention includes:

a display;

10 a computer main unit;

_____ having a mounting section containing a therein including a space,
the mounting section being provided with a first terminal section to exchange
signals with the computer main unit, and a locking section, which are disposed
in the computer main unit, and a space formed in the computer main unit
 15 mechanism; and

another device, which ~~contains another~~ includes a second terminal
section for connecting with the first terminal section to exchange signals with
the computer main unit by connecting with the terminal section, detachably
installed lockable in the mounting section by the locking section mechanism.

20 This ~~another other~~ device has another is preferably a loudspeaker unit
and its terminal section is connectable with the first terminal section for
exchanging power and sound information signals with the computer main unit
through the connection with the terminal section described above.

According to the portable computer device, ~~Yet another device normally~~
 25 required for mobile use and another device required for indoor use are, such as
a rechargeable battery, is preferably provided to be exchangeably inserted in
the space a mounting section of the computer main unit. With the this

structure, the portable computer device satisfactorily delivers its advantage, i.e., being small and lightweight without impairment of the capability, regardless of whether in mobile-use or indoor-use.

5

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a perspective view illustrating a notebook-sized personal computer and a detachable another device that are shown in an embodiment of the present invention.

Fig. 2 is a perspective view illustrating a personal computer and a
10 plurality of detachable another devices that are shown in another embodiment.

Fig. 3 is a perspective view illustrating a notebook-sized personal computer as a type of prior art portable computers.

DETAILED DESCRIPTION OF THE PREFERED EMBODIMENTS

15 First preferred embodiment

Hereinafter, the portable computer device of the first embodiment of the present invention will be described with reference to the perspective view of the notebook-sized personal computer in Fig. 1, wherein the same parts are identified by the same reference numerals as ones in the notebook-sized
20 personal computer in Fig.3, which is a type of conventional portable computer devices device.

In Fig. 1, the portable computer device contains keyboard-equipped computer main unit 1a, foldable display 2 made of a liquid crystal display (LCD), and loudspeaker units 5 disposed in space 6 in main unit 1a.

25 Computer main unit 1a further comprises first mounting section 3a and second mounting section 3b.

The first mounting section 3a includes first terminal section 3d1 for

exchanging information with power supply and computer main unit 1a, and a locking section that detachably locks another device. For the locking section, a known locking mechanism, for example, press-fitting is employed (not shown.) First ~~insertion-mounting~~ section 3a ~~has~~ includes a space therein. The space is
 5 formed so that an I/O device including a floppy disk drive (not shown), and a rechargeable battery are installed in first mounting section 3a. Such an installed device has a ~~first~~ another terminal section (not shown), which exchanges information with power supply or computer main unit 1a by connecting with terminal section 3d1.

10 Second mounting section 3b includes second terminal section 3d2 for exchanging power supply with computer main unit 1a, and a locking section for detachably locking another device ~~so as to be detachable~~. The locking section (not shown) is formed ~~as in~~ the same way as that of first mounting section 3a. Second mounting section 3b also has a space therein. The space is for
 15 accepting another device (not shown) having a ~~second~~ another terminal section (not shown), which exchanges information with power supply and computer main unit 1a by connecting with second terminal section 3d2.

Loudspeaker device 4, which is described as another device, contains an amplifier therein and port 4a for reproducing low audio frequencies. As shown
 20 in Fig. 1, when the loudspeaker device 4 is installed in the mounting section 3c, the port 4a opens to an exterior of the computer main unit 1b.

Loudspeaker device 4 is detachably installed in first mounting section 3a or second mounting section 3b. Through second terminal section 4b, loudspeaker device 4 is provided with power supply and sound information from
 25 computer main unit 1a.

When installed in first mounting section 3a or second mounting section 3b of computer main unit 1a, loudspeaker device 4 ~~activates~~ is activated by

connecting second terminal section 4b with first terminal section 3d1 or second terminal section 3d2 and thereby receiving power supply and sound information from computer main unit 1a.

In the embodiment, loudspeaker units 5 are installed in computer main unit 1a. Therefore, loudspeaker device 4 may be used for reproducing a low-pitched sound that cannot be covered by loudspeaker units 5.

Loudspeaker device 4 also may be used as a full-range speaker in such a way that loudspeaker units 5 do not work while loudspeaker device 4 is installed in computer main unit 1a.

Besides, although loudspeaker device 4 has been described as having a built-in amplifier in the explanation above, a loudspeaker having no amplifier may be acceptable if an adequately large output of sound information is provided from computer main unit 1a.

Although loudspeaker device 4 is described as a detachable device in the embodiment, the detachable device is not limited to loudspeaker device 4. A battery or a hard disk device may also be a detachable device. Without increasing the bulk of the body, the portable computer can exert its functions regardless of whether in mobile-use or table top-use, by installing the appropriate ~~one~~-detachable device selected ~~in~~-from such devices as required.

20

Second Preferred Embodiment

Fig. 2 illustrates a notebook-sized personal computer in another embodiment of the present invention, wherein the same parts are identified by the same reference numerals as ones described in the first preferred embodiment. In Fig. 2, the portable computer device comprises keyboard-equipped computer main unit 1b, foldable display 2 made of an LCD, and loudspeaker units 5 disposed in space 6 in main unit 1b.

Computer main unit 1b has mounting section 3c.

Mounting section 3c includes terminal section 3d for exchanging information with power supply and computer main unit 1b, and a locking section that detachably locks another device. For the locking section, a mechanism similar to that employed for first mounting section 3a in the first preferred embodiment can be used. Mounting section 3c has a space therein. The space is formed so that I/O device 7 including a floppy disk drive, and a rechargeable battery are installed in mounting section 3c. Such an installed device has ~~a first~~ another terminal section 7a, which exchanges information with power supply and computer main unit 1b by connecting with terminal section 3d. Loudspeaker device 4 is detachably installed in mounting section 3c. Loudspeaker device 4 is provided with second terminal section 4b for receiving power and sound information from computer main unit 1b.

When carrying the notebook-sized personal computer having such a structure described above, a rechargeable battery (not shown) is installed in mounting section 3c. On the other hand, when the computer is used indoors and so on, i.e., commercial power is available, I/O device 7 such as a floppy disk drive, or loudspeaker device 4 can be installed in mounting section 3c.

In this way, ~~the~~ as much expandability ~~as much as one equipped with a~~ desktop computer ~~is~~ can be realized in the notebook-sized personal computer, taking full advantage of its small sized and lightweight body.

In the figure and explanation of the second embodiment, I/O device 7 and loudspeaker device 4, which are installed in mounting section 3c, have been described as having the similar size as mounting section 3c. However, I/O device 7 and loudspeaker device 4 may be smaller, or bigger than mounting section 3c. Such devices will be acceptable, in such a way that another terminal section to be a counterpart of terminal section 3d is disposed in

another device, such as I/O device 7 and loudspeaker device 4, and the device is lockable by the locking section in mounting section 3c.

Besides, although loudspeaker device 4 is described as having port 4a in the two embodiments, other systems, such as a sealed speaker enclosure type system, a band-pass-box type system, an acoustic labyrinth type system, and a horn type system, are also acceptable.

INDUSTRIAL APPLICABILITY

As described above, the portable computer device of the present invention comprises a terminal section for exchanging signals with the computer main unit, a locking section for detachably locking an installed another device in the computer main unit, and an a mounting section having a space formed in the computer main unit. Another device is detachably installed in the mounting section, so that the device required for mobile-use and the device required for indoor-use can be installed in the space in the mounting section, replacing with each other as required. Regardless of indoor-use or outdoor-use, the portable computer device satisfactorily delivers its advantage, i.e., being small and lightweight without impairment of its performance.

In addition, in the case that a loudspeaker unit having an acoustic space is installed as another device, the portable computer, when used indoors, employs the loudspeaker unit. Without an external add-on loudspeaker unit for reproducing low-audio frequencies, and without being bulky inconveniently for portables, the computer can reproduce low-pitched sound and obtain sound response having high quality acoustic characteristics.

Furthermore, in the case that a loudspeaker unit having an acoustic space and an amplifier is installed as another device above, when used indoors, without an external add-on loudspeaker unit for reproducing low-audio

frequencies, the computer can reproduce low-pitched sound and obtain sound response having high quality acoustic characteristics, though it is a portable computer.

Besides, in the case that a power supply terminal, which supplies power
5 to ~~an~~ another device or connects a rechargeable battery, is disposed at the mounting section of the computer main unit, the computer can accept the devices ~~required~~ requiring power supply ~~for connections~~ such as devices reading or writing information, ~~such as~~ a rechargeable battery, a floppy disk drive, and a CD-ROM drive. The portable computer thus can make the most of its
10 expandability, taking full advantage of its small sized and lightweight body.

Likewise, in the case that a plurality of terminals are disposed at the mounting section of the computer main unit so that power supply ~~is~~ can be delivered ~~with each other~~ between the plural terminals and a rechargeable
15 battery having a relatively large volume, the mounting section can detachably accept a loudspeaker unit, which has an acoustic space and a built-in amplifier, and another terminal that receives power and sound information from the computer main unit by connecting with the terminal section of the computer main unit.

In this case, the mounting section for the rechargeable battery with a
20 relatively large volume is used for the loudspeaker unit. Such an installation can realize the sound output with the frequency response, which is greatly improved in reproducing low-audio frequencies.

Abstract

A portable computer device that realizes its versatility, without impairment of its advantages, i.e., being small, lightweight and powerful. The portable computer device comprises terminal sections (3d1, 3d2) exchanging
5 signals with computer main unit (1a), a locking section for locking another device to be installed, and mounting sections (3a, 3b) made of a space that accommodates the terminal sections and the locking section therein. According to the portable computer device, ~~the device~~ devices required for mobile-use and ~~the device required for table top-use~~ can be exchangeably
10 exchangeably installed in the space. Therefore, the portable computer device exerts a greater expandability without impairment of its advantage.